Mechanical Operating Instructions

GB

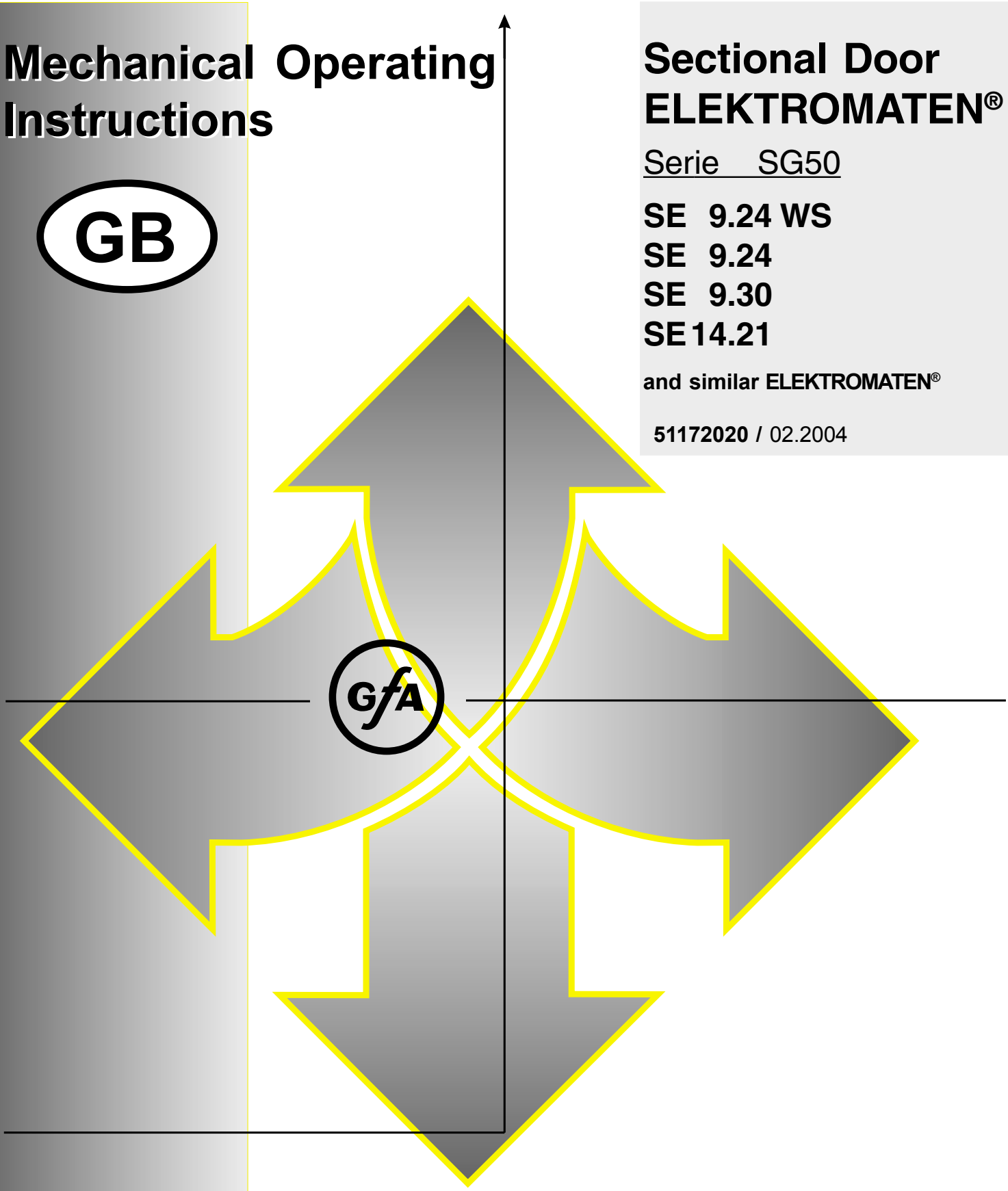
Sectional Door ELEKTROMATEN®

Serie SG50

SE 9.24 WS
SE 9.24
SE 9.30
SE 14.21

and similar ELEKTROMATEN®

51172020 / 02.2004



ELEKTROMATEN®

TÜV CERT
DIN EN ISO 9001:2000
Zertifikat: 01 100 5118

OPERATING INSTRUCTIONS

52210003

consisting of:

M : Mechanical Operating Instructions

E : Electrical Operating Instructions (separately enclosed)

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GENERAL DIRECTIONS

The sectional door ELEKTROMATEN® is intended for driving sectional doors with precise spring or weight counterbalancing. All other applications of the ELEKTROMATEN® need to be approved by the manufacturer.
Where changes are made to the ELEKTROMATEN® (e.g. re-wiring), the manufacturer's declaration of incorporation cease to apply.

Basic Directions

This drive has been built and tested in accordance with ***DIN EN 12453 Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements*** and ***DIN EN 12604 Industrical, commercial and garage doors and gates - Mechanical aspects - Requirements*** and left the factory in perfect condition from the point of view of safety. To maintain this condition and to ensure safe operation, the user must observe all the directions and warnings contained in these operating instructions.
In principle, only trained electrical craftsmen should work on electrical equipment. They must assess the work which has been assigned to them, identify potential danger sources and take suitable safety precautions.
Reconstruction of or changes to ELEKTROMATEN® are only permissible with the approval of the manufacturer. Original replacement parts and accessories authorised by the manufacturer guarantee safety. Liability ceases to apply if other parts are used.
The operational safety of an ELEKTROMATEN® is only guaranteed if it is used in accordance with the regulations. The limiting values stated in the technical data should not be exceeded under any circumstances (see corresponding sections of the operating instructions).

Safety Regulations

During the installation, initial operation, maintenance and testing of the ELEKTROMATEN®, it is necessary to observe the safety and accident-prevention regulations valid for the specific application.

In particular, you should observe the following regulations (this list is not exhaustive):

European normative

- DIN EN 12453
  Safety in use of power operated doors - Requirements
- DIN EN 12604
  Industrial, commercial and garage doors and gates - Mechanical aspects - Requirements

Please check normative´s bellow.

VDE-regulations

- VDE 0100
  Regulations regarding the construction of power installations with a nominal voltage of up to 1000 V
- VDE 0105
  Operation of power installations
- DIN EN 60204-1 / VDE 0113-1
  Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- DIN EN 60335-1 / VDE 0700-1
  Safety of household and similar electrical appliances - Part 1: General requirements

Regulations

– Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

Explanation of warnings

These operating instructions contain directions which are important for using the ELEKTROMATEN® appropriately and safely.

The individual directions have the following meaning:

DANGER
This indicates danger to the life and health of the user if the appropriate precautions are not taken.

CAUTION
This warns that the ELEKTROMATEN® or other materials may be damaged if the appropriate precautions are not taken.

General warnings and safety precautions

The following warnings are to be understood as a general guideline for working with the ELEKTROMATEN® in conjunction with other devices. These directions must be observed strictly during installation and operation.

- Please observe the safety and accident prevention regulations valid for the specific application. The installation of the ELEKTROMATEN®, the opening of covers or lids and electrical connection must be carried out when the supply is switched off.
- The ELEKTROMATEN® must be installed with the authorised coverings and protective devices. Care should be taken that any seals are fitted correctly and screw couplings are tightened correctly.
- In the case of ELEKTROMATEN® with a permanent mains connection, an all-pole main switch with appropriate back-up fuse must be provided.
- Check live cables and conductors regularly for insulation faults or breakages. When a fault is detected in the cabling, the defective cabling should be replaced after immediately switching off the mains supply.
- Before starting operation, check whether the permissible mains voltage range of the devices corresponds to the local mains voltage.
- Emergency stop devices in accordance with VDE 0113 should remain operational in all operating modes of the control. Releasing the emergency stop device should not cause any uncontrolled or undefined restart.

TECHNICAL DATA

Size		SE 9.24 WS Single phase	SE 9.24	SE 9.30	SE 14.21
hollow shaft diameter	mm	25 / 25,4	25 / 25,4	25 / 25,4	25 / 25,4 30 / 31,75 / 35
output torque	Nm	90	90	90	140
static stability	Nm	240	240	240	450
door weight up to approx. (observe permissible cable forces for balanced doors with 1-2 counterbalancing springs on a drum of ø160 mm)	N	3000	3000	3000	6000
output revolutions	min $^{-1}$	24	24	30	21
motor performance	kW	0,45	0,37	0,37	0,45
operational voltage	V	1 x 230	3 x 230/400	3 x 230/400	3 x 230/400
frequency	Hz	50	50	50	50
control voltage	V	24	24	24	24
nominal motor current	A	4	2,1 / 1,2	2,1 / 1,2	3,1 / 1,8
motor duty cycle	ED	S3-20%	S3-60%	S3-60%	S3-60%
power supply / fusing on attachment side		3x1,5^2 / 10A delay	5x1,5^2 / 10A delay	5x1,5^2 / 10A delay	5x1,5^2 / 10A delay
limit switch range, max. revolutions of the hollow shaft		20	20	20	20 (14*)
permissible temperature range (in the case of deviation, please check)		-5°C / +40°C	-5°C / +40°C	-5°C / +40°C	-5°C / +40°C
permanent sound emission	dB(A)	< 70	< 70	< 70	< 70
class of protection	IP	54	54	54	54
ELEKTROMATEN® weight	kg	16	15	15	16

*Limit switch range for hollow shaft diameter 30/31.75/35 mm

In the case of structurally similar ELEKTROMATEN® or special sizes, deviations are possible, in particular in the output torque, output revolutions and the motor data. In each case, the details on the nameplate apply.

STATIC STABILITY: Counterbalanced door leaves are prevented from falling down if the drive is capable, when the spring breaks, of holding the weight of the leaf, even under these conditions. This prerequisite is made by the rule BGR 232. The static stability is the permissible load bearing of the gear construction which can occur when the spring breaks.
The static stability Mstat is calculated as follows:

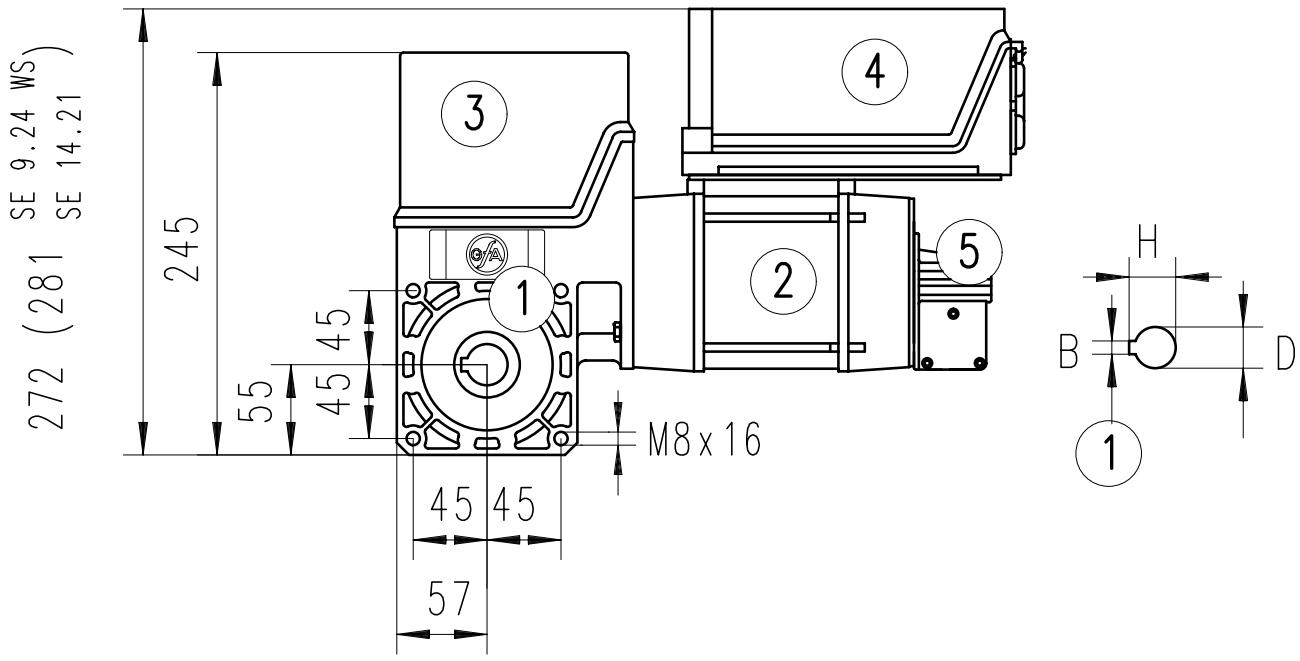
Mstat [Nm] = leaf weight [N] × radius of the cable drum [m]

Since it is possible for 2 counterbalancing springs to fail simultaneously, the technical committee Structural Equipment recommends that the drive be dimensioned such that it can support
- the entire leaf weight where there are one or two counterbalancing springs
- 2/3 of the leaf weight where there are three counterbalancing springs
- 1/2 of the leaf weight where there are four counterbalancing springs

According to the above guidelines, the substantially higher breaking load of the gear construction should not be taken into account when dimensioning the drive. The greatest winding diameter should be taken into account in the case of tapered cable drums. The permissible cable forces must be observed.

Safety directions:
When using ELEKTROMATEN® with a declutching mechanism a safety brake is required.

DIMENSIONS



Model NHK (Execution SK without Fig.)
Manual crank

① Hollow shaft / worm gear
② Electric motor
③ Limit switch
④ Removable reversing contactor with 0.7m cable
⑤ Emergency manual operation

Hollow shaft diameter D [mm]	B [mm]	H [mm]
25	8	28,3
25,4	6,35	28,4
30	8	33,3
31,75	6,35	34,7
35	6	38,3
	10	38,3

- Subject to dimensional and structural changes
- deviations in the overall length and the motor diameter are possible in special sizes

After assembling and counterbalancing the in accordance with the manufacturer's instructions, the door should be balanced in every position. The correct counterbalancing is controlled by opening and closing the door by hand. In the case of ELEKTROMATEN® which have already been installed, the correct counterbalancing is controlled with the emergency manual operation. The operating force should be equal in both directions.

Top-mounted drive (Fig. 1/2)

The ELEKTROMATEN® is pushed gently onto the spring shaft, which is lubricated in the drive region. In a continuous shaft groove, the key (1) is secured against displacement with 2 screws on both sides of the gear hollow shaft.
In order to mount the torque support and/ or flange bracket (2), holes should be provided in the bracket on the attachment side. The tightening torque required for the fixings is 20 Nm.

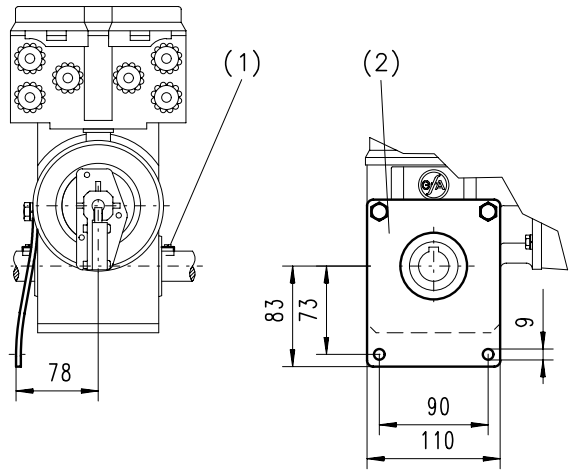


Fig. 1: Top-mounted drive with torque support

Chain drive (Fig. 3)

The ELEKTROMATEN® is mounted with foot angles (1) and slide rails / brackets. Drive takes place via a stub shaft with a sprocket (2).
After removing the retaining ring and the supporting disk (3), the stub shaft can be pulled out and the output side can be changed.
The sprocket should only be assembled when the stub shaft is extended. The chain should not be overstrained. (The sagging in the slack strand should be maximum 2% of the axle distance); the sprockets should be in alignment.
The standard transmission is 1:1. When the transmission is changed to "high-speed" (large sprocket on the ELEKTRO-MATEN®), the permissible leaf weight should be reduced (check with us, if necessary).

If the gearbox housing is provided with an additional coat of paint, the shaft sealing rings should not be painted under any circumstances.

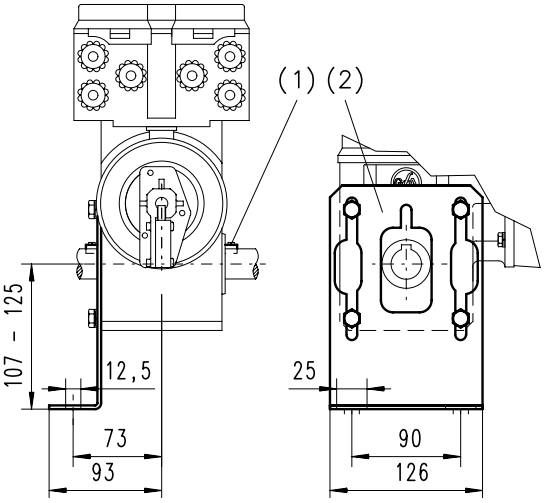


Fig. 2: Top-mounted drive with flange bracket

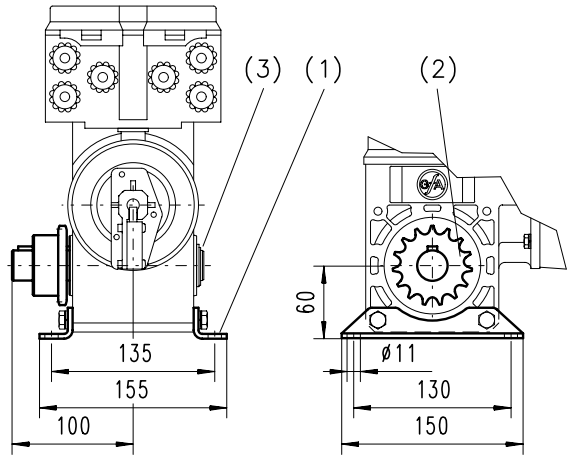


Fig. 3: Chain drive

EMERGENCY MANUAL OPERATION

52250013

The emergency manual operation is provided in order to open or close the door without an electrical supply.

Warning! Danger of injury through improper operation!

- Before using the emergency manual operation, the main switch should be switched off.
- The emergency manual operation should only be carried out when the motor is stationary.
- A secure position should be adopted to operate the equipment manually.
- In the case of ELEKTROMATEN® with a spring-operated brake, the door should be opened or closed with the brakes on. For safety reasons, the brakes should only be lifted for inspection.
- Precautions must be taken on the construction site to prevent the brake from being lifted unintentionally.

The door should not be moved beyond the normal end positions by the emergency manual operation, since this will operate the safety limit switch. Electrical operation of the door is then no longer possible.

Emergency manual operation by the manual hand crank (NHK) (Fig. 1)

- The manual crank must be inserted into the manual switch receptacle and is turned whilst pressing gently until it engages, on that way the control circuit would be interrupted. It is no longer possible to operate the door electrically.
- The door can be opened and closed by turning the manual crank
- After pulling out the manual crank, electrical operation is once possible.

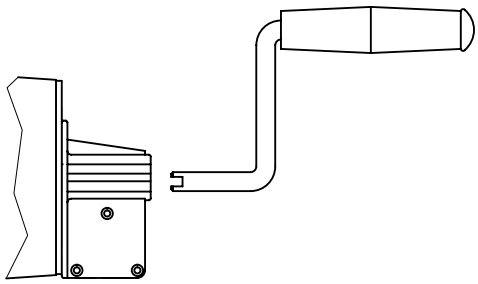


Fig. 1: Emergency manual operation "manual hand crank"

Emergency manual operation - declutching (ER) (Fig. 2)

- When using an ELEKTROMATEN® with a de-clutching mechanism a safety brake is required.
- The emergency manual operation can be used on operators installed horizontally (limit upwards) and vertically (motor bellow)
- To declutch the self-locking gear, pull the red disengaging handle (max. operating force260 N)
- The balanced door, can be moved by hand
- After pulling the green engaging handle the drive unit is ready for electrical service.

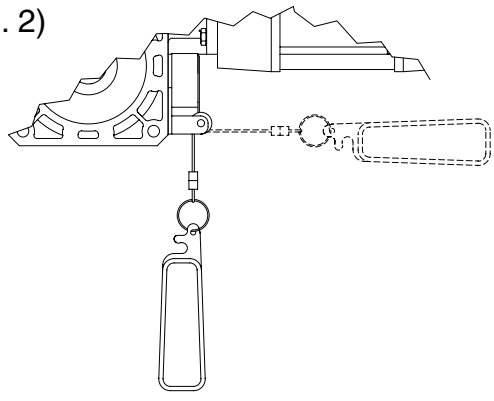


Fig. 2: Emergency manual operation "declutching"

Attention:
If the door is set so that it rests on the ground and the cable is slack, the hand force for declutching can increase to about 260N.

EMERGENCY MANUAL OPERATION

52250011

Execution: **SK** **"Rapid hand chain operator"** (Fig. 1)
Execution: **KNH** **"Chain operator"** (without Fig.)

Emergency manual operation
"Rapid hand chain operator" (Fig. 1)

- The red handle of the engaging and disengaging mechanism is first pulled lightly until it stops (max. operating force 50N), the control circuit is now interrupted, it is no longer possible to operate the door electrically.
- The door can be opened and closed by pulling the chain (2).
- By lightly pulling the engaging and disengaging mechanism by the green handle until it stops (3) (max. operating force 50N), the control circuit is re-made and the door is electrically operational.

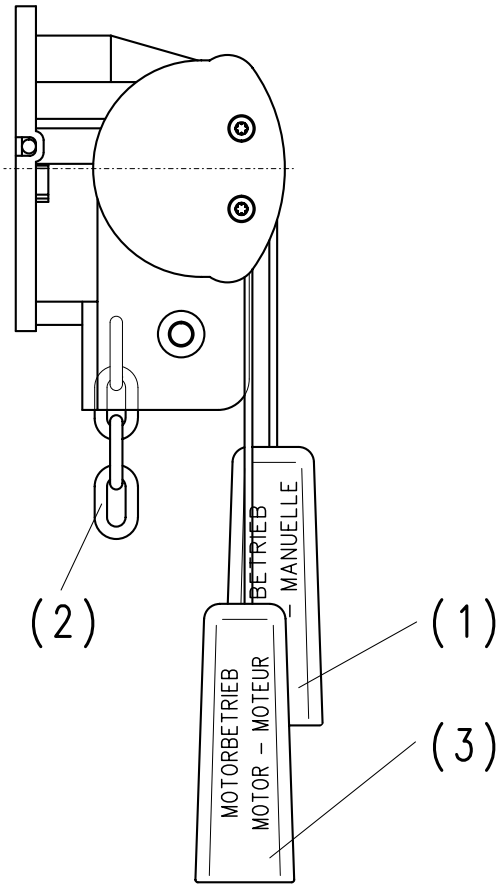


Fig. 1: Emergency manual operation "Rapid hand chain operator"

Variation of the hand chain length (Fig. 2)

- The hand chain can be opened at the connection point and can be lengthened or shortened with connecting links.
- The connecting links should be bent together carefully.
- When changing the chain length, care should be taken that the chain is cross - assembled (Fig. 2).

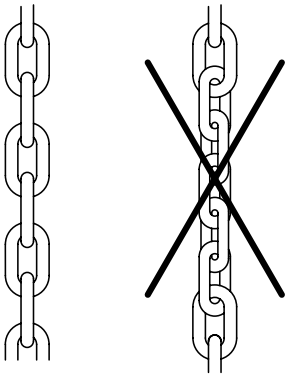


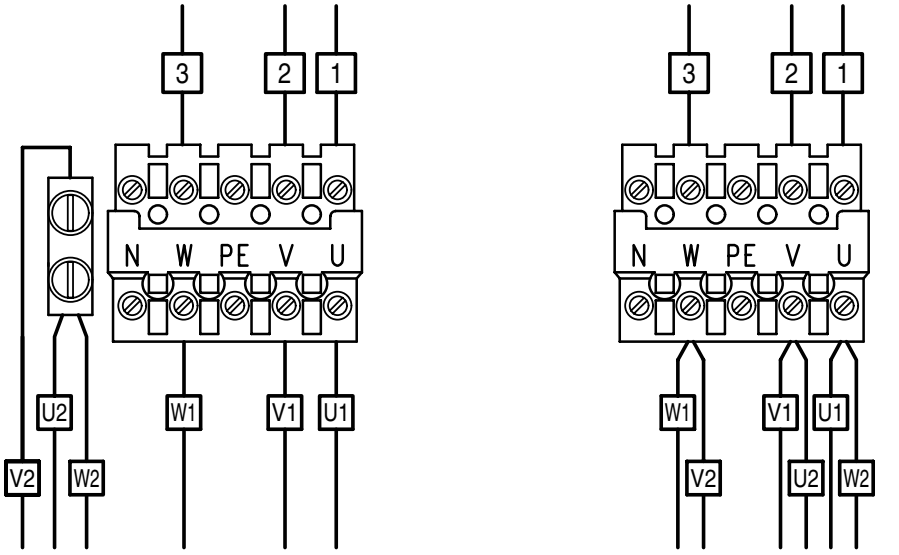
Fig. 2: Variation of the hand chain length

VOLTAGE CHANGEOVER OF MOTORS

52390009

Warning! Danger to life through electric shock
Before starting assembly, disconnect the cables from the electricity supply and check that they are dead.

The motor windings are wired so that it is possible to operate the ELEKTROMATEN® on a 3 X 400 V or 3 X 230 V supply.
Ex factory the motor is wired in star connection for a 3 X 400 V mains. The motor should be in delta connection for a 230 V mains.
In order to change-over the voltage of the motor, the ends of the coils should be re-arranged, as shown in Fig. 1.



Star connection
400 VAC

Delta connection
230 VAC

Fig. 1: Motor terminals plug in connection

When attaching the motor cables, care should be taken that the individual cables are inserted deep enough to ensure secure connection.
This connection can be checked by pulling the cables.

If the motor is changed over for operation in a 3 X 230 V mains, the reversing contactor board should also be modified.
At Universal - contactor board, fit link G between T1 -T2.
(electrical operating 51171134)

LIMIT SWITCH ADJUSTMENT

52340004

Adjusting the working limit switches sets the upper and lower stopping positions of the door. In order to make this adjustment, the ELEKTROMATEN® should be connected electrically. The limit switch board (Fig. 2: limit switch board with 7 limit switches) is accessible after unscrewing the limit switch cover. If no external control devices are fitted, the door can be moved in dead man operation using the built-in OPEN, CLOSE and STOP push buttons (S11-13) where a reversing starter has also been supplied.
The door should open when the pushbutton S11 is operated, otherwise the two phases L1 and L2 should be exchanged at the contactor with the current switched off.

Lower stopping position

In order to adjust the limit switch for the lower stopping position of the door, the following steps should be carried out (Fig. 1):

- shut the door
- rotate switching cam (1) of the limit switch "CLOSE" to the middle of the switching cam (2) and tighten the coarse adjustment screw (3) with the hexagonal socket screw key supplied
- open door until the limit switch "CLOSE" switches back again
- close door again
- correct lower stopping position, possibly by turning the fine adjustment screw (4); the fine adjustment screw can be moved from both sides with the hexagonal socket screw key supplied
- the "CLOSED SAFETY" limit is pre-adjusted automatically by the limit switch adjustment "CLOSE"
- the switch point for the safety limit switch must be corrected, possibly using the fine adjustment screw, so that the door still stops safely if the direction of rotation is reversed or the operating limit switch fails.

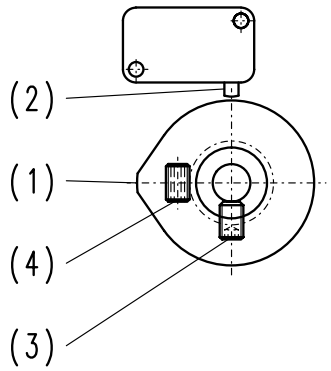


Fig. 1: Limit switch cam

Upper stopping position

After opening the door, the "OPEN" and/or "OPEN SAFETY" limit switch are adjusted similarly to the lower position.

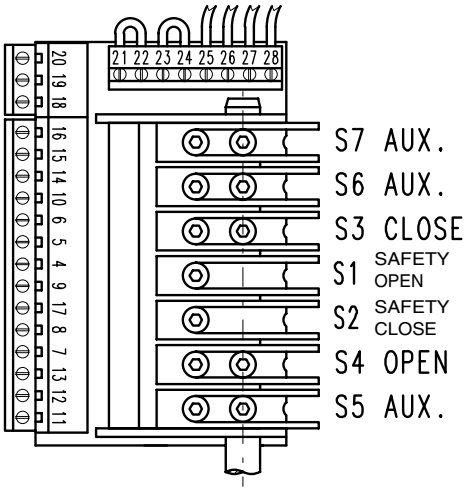


Fig. 2: Limit switch board

SAFETY CIRCUIT

The terminals 21 to 28 on the limit switch board (Fig. 2) are reserved for the safety circuit. An interruption of the safety circuit causes the control current to be interrupted. Electrical operation is then no longer possible.
The terminals 25 to 28 on the limit switch board are connected to the safety switch of the emergency manual operation and/or the thermal protection of the motor.
The terminals 21 to 24 on the limit switch board are provided with jumpers. Additional safety switches can be attached instead of these jumpers.

DIGITAL LIMIT SWITCH (type DES)

52340012

The digital limit (type DES) is an absolute position encoder for doors.
Evaluation and installation of the limit positions is done through the control panel, which corresponds to the electronic limit.
For installation only a 6 pole plug has to be connected. Adjustment of mechanical parts is not required.
The connections for the safety circuit (e.g. safety limits) are on the side of the DES.

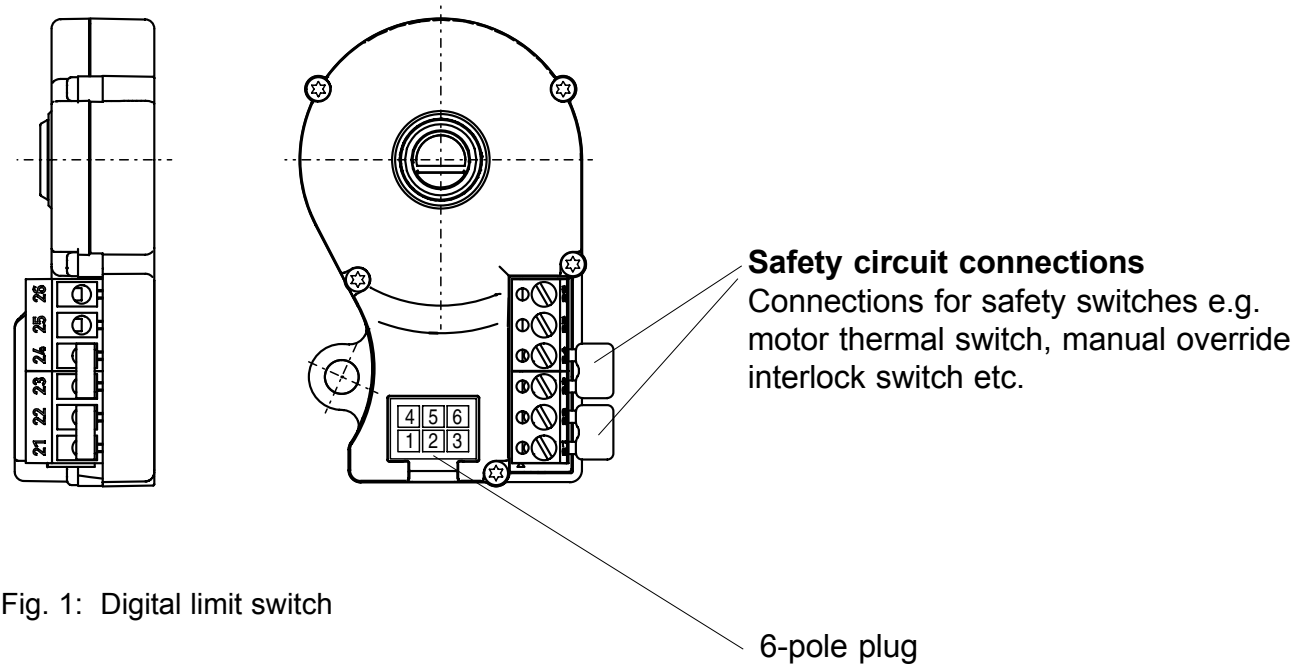


Fig. 1: Digital limit switch

The maintenance of power-assisted windows, doors and gates should only be carried out by persons authorised by the employer and who are familiar with the respective maintenance work.

Directions for the inspector

Gearbox:
The gear construction is maintenance-free and has lifetime lubrication. The output shaft should be kept rust-free.

Attachments:
All attachment screws should be inspected to make sure they are fitted securely and are in perfect condition.

Counter-balancing of sectional doors:
According to the regulations regarding counterbalancing, the door should be balanced in every position (cf. Installation instructions).

Brake (if fitted)
The correct function of the brake should be checked during the annual inspection.
Where there is increased wear, the brake lining or - once the rectifier has been disconnected - the entire brake can be exchanged.

TRANSPORT / STORAGE / DISPOSAL

The ELEKTROMATEN® is assembled completely and is wired ready for connection.
Transport and any storage should be carried out in the provided (or equivalent) packaging to avoid damage.
On disposal the ELEKTROMATEN®,

- metals
- plastic parts
- electric parts
- lubricants

must be separated.

SERVICE / REPLACEMENT PARTS / ACCESSORIES

Please note that replacement parts and accessories which have not been supplied by us have also not been tested and released by us.
Fitting and / or using such products can therefore negatively affect the above properties of the ELEKTROMATEN® and thus reduce its safety.

GfA accepts no liability for nor provides any guarantee against damage caused by using non-original replacement parts and accessories.

Faults which the users cannot rectify themselves should only be corrected by the manufacturer of the door equipment or another specialist firm. Replacement parts can also be requested from such firms.

DECLARATION OF INCORPORATION

according to
EC guidelines 98/37/EC
Low voltage guideline 73/23/EEC
with amendments
Electromagnetic compatibility 89/336/EEC
with amendments

ELEKTROMATEN®
GfA - Gesellschaft für Antriebstechnik
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Wiesenstr. 81

40 549 Düsseldorf (Heerdt)

We, the

GfA - Gesellschaft für Antriebstechnik

Wiesenstr. 81, 40549 Düsseldorf (Heerdt), Germany

hereby declare that the following products conform with the above EC guidelines and are only intended for installation in door equipment.

Product description: Hollow-shaft ELEKTROMATEN®

"The Safedrive compact"
"The Safedrive"
"The Rapid Safedrive"
"The Rapid Safedrive RAS-F"

Sectional door	ELEKTROMATEN®
Chain drive	ELEKTROMATEN®
Sliding door	ELEKTROMATEN®
Swing door	ELEKTROMATEN®
Cable drum	ELEKTROMATEN®
Folding door	ELEKTROMATEN®
Rapid handchain	ELEKTROMATEN®

Harmonised norms applied

- **DIN EN 12543**
  Safety in use of power operated doors
  - Requirements

- **DIN EN 12604**
  Industrial, commercial and garage doors and gates - Mechanical aspects
  - Requirements

The machinery to which this Declaration of Incorporation relates must not be put in to service until the relevant machinery into which is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Düsseldorf, 14th May 2001

(GL, Müller) (QMS, U. Hohns)

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